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Who Cares Who Made the Map? ***La Carta del Cantino and its anonymous maker***

Keywords: Cantino World Chart; *La Carta del Cantino*; Pedro Reinel; compass rose

Summary: This paper explores the authorship of the anonymous *La Carta del Cantino* through an analysis of design signatures. Using high resolution digital copies of charts in ArcGIS, *La Carta del Cantino* is compared to contemporaneous charts. The long-held assumption that *La Carta del Cantino* was a surreptitious copy of the Portuguese king's royal pattern chart is rejected in favor of a more simple explanation: Alberto Cantino commissioned the world chart from a chartmaker in Lisbon, and that chartmaker was Pedro Reinel.

An anonymous chartmaker lies behind a magnificent world chart that presents the world as it was becoming known in 1500. Titled *La Carta del Cantino*, the planisphere measures 102 x 218 cm. Africa dominates its center, newly discovered islands and mainlands rise in the West, India and Southeast Asia emerge in the East, and a carefully delineated Europe appears in the North. Brilliant illuminations evoke distant landscapes while an elaborate compass rose anchors the map in Africa. At right angles to coastlines appear hundreds of toponyms (place names), and flags mark the realms of kings and dukes. Texts written in Portuguese describe lucrative trading opportunities across the seas. On the back, in the upper right hand corner, a hand has written that the “Carta da Navegar” (navigational chart) is given by Alberto Cantino to Ercole I, the Duke of Ferrara (fig. 1).¹

Does it matter that we know the agent who delivered the chart but not the chartmaker who made it? For the geographer, cartographer, and artist Denis Wood, it does. Wood contends that when the maker of a map and the interests behind the map are “in plain view, it is hard to overlook him, hard to see around her, to the world described, hard to see it . . . *as the world.*” Viewers will interpret a signed map as “no more than a *version* of the world, as a *story* about it, as a *fiction*” making unsigned maps all the more powerful (Wood with Fels 1992: 70). For eminent geographer and map historian J. B. Harley on the other hand, knowing the cartographer is immaterial. In Harley’s view, the chartmaker cannot be autonomous. Cartographers are puppets, beholden to powerful interests behind the map, most often the state. For Harley, it is the patron, not the chartmaker, who matters (Harley 1990: 7; 2001: 63).

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¹ “Carta da navegar per le Isole novam[en]te tr[ovato] in le parte de I;India: dono Alberto Cantino Al S. Duca Hercole.” C. G. A.2, Biblioteca Estense Universitaria, Modena.



Figure 1: Anon, *La Carta del Cantino*. Biblioteca Estense Universitaria, Modena.

In this article, we argue that knowing the chartmaker does matter, even as we recognize that powerful interests lie behind the map. For when the chartmaker becomes visible, new ways of understanding *La Carta del Cantino* come into focus. Once we know the chartmaker, the world chart remains the same but our interpretation of it changes. Knowing the chartmaker challenges the assumption that geographic knowledge in the early sixteenth century was the monopoly of the state and poses new questions about how knowledge was acquired, claimed, and shared in a trans-national maritime community.

Once upon a time, *La Carta del Cantino* might have carried a signature, for the world chart shows evidence of having been trimmed, most likely in the mid-nineteenth century.² At the end of the nineteenth century, the Americanist Henry Harrisse suggested that Alberto Cantino “ordered it from a cartographer living in Lisbon,” although Harrisse believed the chartmaker “to have been an Italian artist” (Harrisse 1892; 1969: 422). Portuguese historian Duarte Leite proposed in the 1920s that the chartmaker was “presumably official,” i.e., in the Portuguese king’s employ, and that the world chart was a copy of one or more official prototypes. The resulting world chart, in Leite’s view, delivered a representation of “the state of Portuguese geographic knowledge at the time” (Leite 1923: 229, 232). Following Leite, historical cartographers and historians continued to read *La Carta del Cantino* as an illicit exposé of the Portuguese crown’s accumulated secret knowledge about the world. In the monumental *Portugaliae Monumenta Cartographica*, Armando Cortesão and Avelino Teixeira da Mota argue that *La Carta del Cantino* was “perhaps copied (in part at least) from the official *padrão*, or standard map of the world on which all the new discoveries were recorded as soon as the information reached Lisbon.” In their view, Antonio Cantino, a “secret agent,” used nefarious means to obtain a copy of the Royal Pattern Chart from a chartmaker working in an official position in the

² Above Greenland the legend is incomplete and what looks like the lower part of an ornate capital letter is visible, suggesting that the chart was trimmed (Gaspar 2010: 132). Leite (1923: 225) describes Giuseppe Boni, the director of the Biblioteca Estense, as having discovered the map in a sausage-maker’s shop in Modena, after 1849, when it was believed the map was stolen during popular riots. Boni, according to Leite, noticed the trim.

Armazém da Guiné e Índias (Storehouse of Guinea and Indies), where nautical charts were kept (Cortesão and Mota 1960: I, 7-9).

This interpretation has persisted (Perreira 1989; Milano 1991) because it does make sense. *La Carta del Cantino* does present the maritime interests of merchants, many of whom had the support of the Portuguese crown. Furthermore, historians have noted that the world chart distorts, even falsifies, geography in ways that benefitted the Portuguese crown's claims to territory (Fernandes 2003: 111-115; Couto 1997: 191). The Line of Demarcation, established by the Treaty of Tordesillas (1494), visible on the world chart as a red meridian in the eastern Atlantic, places Newfoundland and Brazil clearly in the Portuguese sphere. Many red and blue flags bear the crest of the House of Avis, and in marking coastlines in Africa, South America, and India, the flags proclaim the Portuguese crown's intention to claim global commercial rights. In the words of Harley, the anonymous *Carta del Cantino* does suggest how "[m]aps quickly became key documents in the launching of the Luso-Hispanic empires" (Harley 1988: 61).

Tied to the role of maps in proclaiming rights of the early modern state is cartographic secrecy (Harley 1988). Portuguese scholars have argued at least since the middle of the nineteenth century that the Portuguese crown suppressed geographic knowledge. In 1841, Francisco Justiniano Saraiva found it very odd that the sources Portuguese historians might expect to find in archives—documents that described the early Portuguese voyages of exploration—did not exist. Saraiva recognized that many reasons could account for the disappearance of such documents, but one might have been the "prudent and cautious secrecy in which our rulers, at first, kept such memoirs and reports" (Domingues 1990). This absence extends to maps. Cortesão and Mota write that "[t]his almost complete disappearance of the earliest charts, which we know to have existed, is the most amazing mystery in the history of Portuguese cartography" (Cortesão and Mota 1960 I: xlv). Best articulated by Jaime Cortesão, the hypothesis holds that the Portuguese kings followed a policy of secrecy (*política do sigilo*) that limited information about nautical science, geography, map making, and commercial opportunities from leaving Portugal (Cortesão, J. 1960). For example, historical sources dating from the time when *La Carta del Cantino* was made describe King Manuel as having placed the death penalty on anyone who gave out information about Vasco da Gama's route to India.³

Read against this backdrop of crown interests and secrecy, the usual interpretation of *La Carta del Cantino* owes little to its anonymous chartmaker. Instead, Alberto Cantino becomes the important historical actor. Whereas Cantino recognized the value of the chart, acquired it for his patron, and carried it to Genoa, the anonymous chartmaker merely copied the king's charts. The chartmaker is not a creator or a synthesizer of geographic knowledge. Fittingly, sometime after it reached Ferrara, the world chart became known as *La Carta del Cantino* (Cantino's Chart), and its chartmaker dropped into oblivion.

Yet, historians have critiqued for some time the *política do sigilo* hypothesis by arguing that the missing sources containing Portuguese maritime knowledge could have been lost for a variety of

³ "De carta de quel viazo [de Calicut] non è possibile haverne, che 'l Re ha messo pena la vita a chi le dà fora," Angelo Trevisan to Domenico Malipiero, Granada 21 August 1501. Later Trevisan did obtain a copy: "Se veniamo a Venetia vivi, vostra Magnificencia vedrà carte et fino a Calicut et de là piu che non do fiate de qui en Fiandra." Angelo Trevisan to Domenico Malipiero, "Ecija, 3 December 1501 (Trevisan 1993: 28, 41). In 1504, King Manuel prohibited any chartmaker from showing the geography past the lands of the King of Manicongo, Leis, Maço 2, n. 12, ANTT.

reasons, not simply secrecy. Moreover, historians have pointed out that if the crown held such a policy it was clearly ineffective (Cortês, A 1960: 60-61; 171-173; Domingues 1990; Alegria et al 1998, I: 38-39). Recently, the cartographic historian Joaquim Alves Gaspar questions whether *La Carta del Cantino* was a copy of the Royal Pattern Chart because it contains so many errors in scaling, in locations of known places, and in cartographic know-how. Gaspar speculates that the world chart was originally made for a different client, such as an important official or nobleman, and that Alberto Cantino somehow obtained it and deviated it to the Duke of Ferrara (Gaspar 2010: 181, 132).

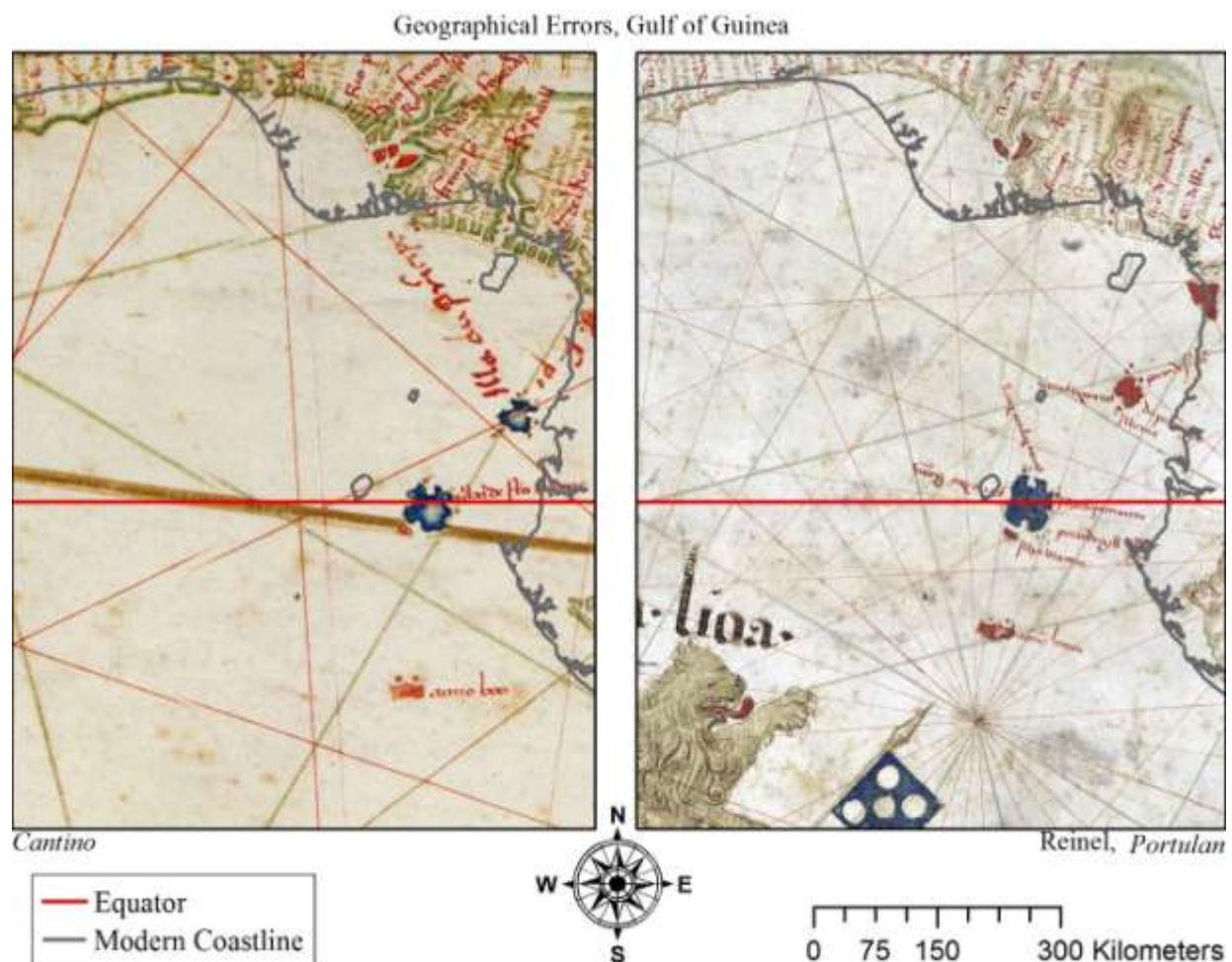
How can an anonymous chartmaker be named? Absent historical sources, visual and geographical similarities between charts have been used in the past. An “error signature” can be sought, such as a consistently mis-mapped feature. Forensic analysis of handwriting could be done, as well as chemical analysis of pigments. No method will be conclusive. We propose to outline several implicit elements of the chart that may be considered design signatures. We begin with the fact that the making of charts in the sixteenth century had much in common with painting (Buisseret 2003: 29-48) and even more so with the production of illuminated books and manuscripts. The tools—brushes, knives, and quill pens—and materials—inks, paints, and vellum—were essentially the same whether one created a chart or an illuminated manuscript. Chartmakers were geographers, but they were artists, too. Whether or not chartmakers signed their charts, they nevertheless had their own personal styles. These styles may be evident in obvious artistic elements, such as visual vignettes, illuminations, or compass roses. But also suggestive of the “hand” of the chartmaker are implicit design elements, such as the rendering of coastlines and lettering. We recognize that identifying design signatures is suggestive rather than conclusive. We do not lose sight of the fact that charts were made in workshops and that chartmakers had assistants. Quite possibly, multiple “hands” worked on a chart, especially one as large and as sumptuous as *La Carta del Cantino*. Nevertheless, our intent is to show compelling visual and design similarities between *La Carta del Cantino* and the charts signed by Pedro Reinel. Based on these design signatures, we conclude that there is a chartmaker behind *La Carta del Cantino*, and the most likely candidate is Pedro Reinel.

Pedro Reinel, and his son Jorge Reinel, are two of the best known Portuguese chartmakers of the sixteenth century. Two charts signed by Pedro Reinel survive: *Le Portulan de Pedro Reinel*, which is a chart of the Atlantic coasts of Western Europe and West Africa, and *Atlantik*, a chart of the Atlantic Ocean from 15° N to 60° N. A third chart, *Portolan chart of the Atlantic Ocean* is signed simply REINEL, is dated later (c. 1535), and is attributed to Jorge. Other unsigned charts are attributed to Pedro and Jorge Reinel, as are nineteenth-century copies of charts that have been lost (Cortês and Mota 1960, I: 19-46; Cortês, A 1969, II: 210-223). Our approach compares *La Carta del Cantino* to all surviving charts made in Lisbon around the same time and, in particular, to the two charts signed by Pedro Reinel. We do not include in our comparison nineteenth-century copies of charts that no longer exist. To facilitate our evaluation, we employ digital tools and ArcGIS.⁴

Cartographic historians have used errors in geography or in geographic distortion as “error signatures” to parse out meanings on charts and to assign authorship (Gaspar 2010; Gaspar and Leitão

⁴ The four charts are *Carta Nautica* (ca. 1471), Anonymous, C.G.A.5.c Biblioteca Estense Universitaria, Modena; *Portolan Chart of Mediterranean* (1492) by Jorge Aguiar, 30cea/1492, Beinecke Rare Book and Manuscript Library at Yale University; *Le Portulan de Pedro Reinel* (ca. 1485), 2 Fi 1582bis, Archives Departementales de la Gironde, Bordeaux; *Atlantik* (ca. 1504) by Pedro Reinel, Cod. Icon. 132, Bayerische Staatsbibliothek, Munich.

2014). Whether or not such distortions are indicative of the chartmaker's hand is difficult to determine. They are, however, very suggestive. For example, *La Carta del Cantino* and *Le Portulan de Pedro Reinél* map the Gulf of Guinea in almost exactly the same way and with the same distortions.⁵ In ArcMap, after the Gulf of Guinea coastlines are georeferenced at the same two points (Cabo Tres Pontas and Cabo Lopo Gonçalves), the charts may be compared against the modern coastline and with the Equator (fig. 2). Georeferencing positions the two capes on each historical chart at the same two points on a modern digital map, and applies the same scale. Both *La Carta del Cantino* and Reinél's *Portulan* show similar distortions in the mapping of the coastline in the Bight of Benin, especially at the Niger River delta, as well as in the size and placement of the islands of Bioko, Príncipe and São Tomé. Is this is enough to assign authorship? The error signatures are compelling. However, because it was highly likely that geographic information was widely shared in the maritime community in Lisbon, we cannot be sure that the geographic error lies with one chartmaker, for it may have been generic on many charts.



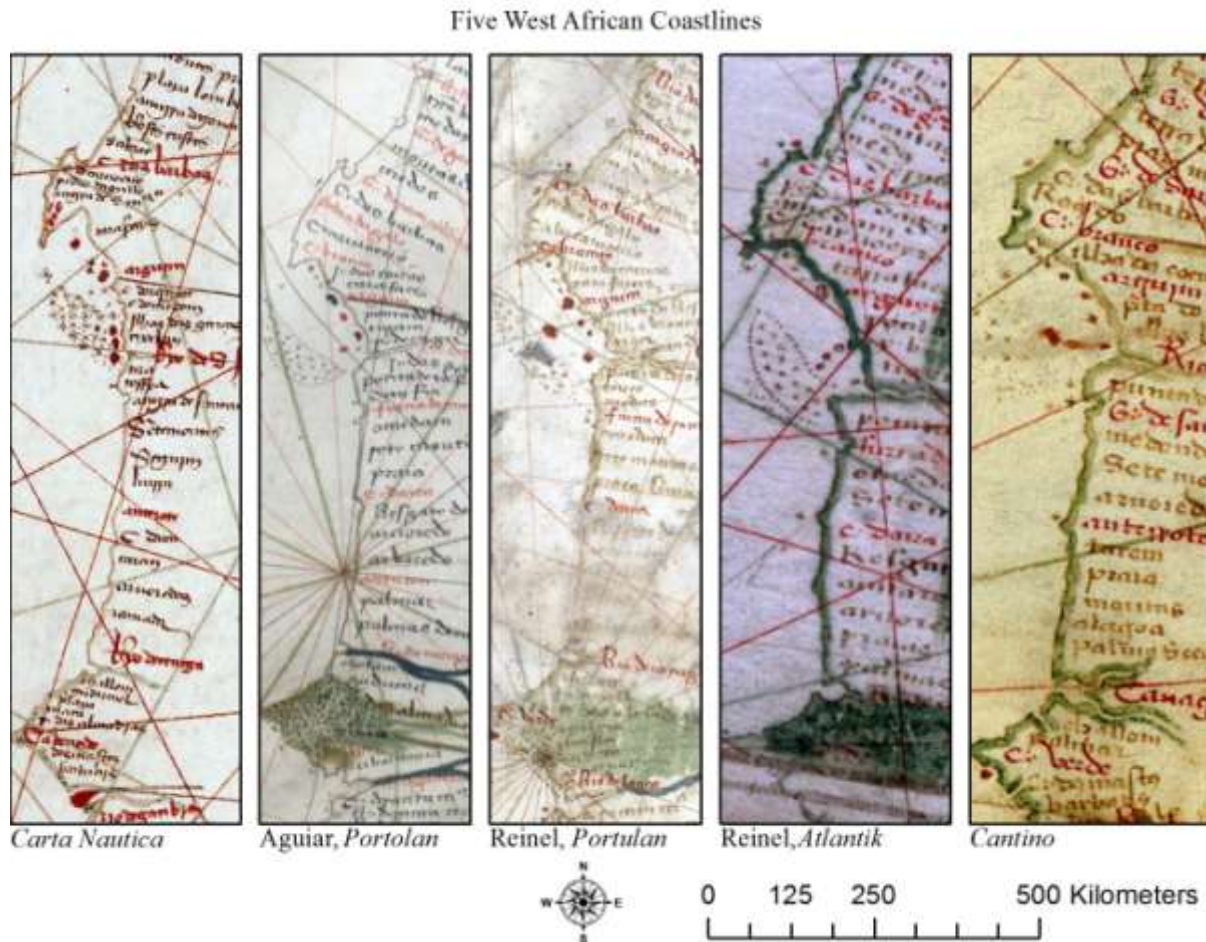
Map 1: Geographical Errors, Gulf of Guinea on *La Carta del Cantino* and *Le Portulan de Pedro Reinél*.

⁵ Reinél's mapping of the Gulf of Guinea, which appears over the interior of West Africa, is attached to the rest of Africa in Photoshop, then georeferenced at the same two points as the Cantino.

One of the most challenging features of a map, and its most important, is the coastline (Monmonier 2008: x, 1). If we focus on the design, rather than the geography, we can approach how chartmakers developed styles to depict coastlines. In other words, our interest is how the coastline was drawn, rather than its accuracy. Alonso de Chaves, a sixteenth-century Spanish chartmaker, wrote a text that summarized how to make a nautical chart (Lamb 1969: 4). Alonso refers to the chartmaker as an artist in his account of how coastlines were entered onto charts. Chaves states that first the chartmaker must correctly locate a major geographical feature, such as a cape, and then carefully determine its latitude. Next the chartmaker locates (by latitude and longitude or by sailing direction and distance) a second prominent geographical feature not too far distant. Then, Chaves states, the chartmaker works as an artist designing the coastline between the two known points (Chaves 1535). From Chaves, it is clear that the exact edge of the coastline did not have to be geographically accurate; instead, the latitudes of the major features that the sailors would encounter, such as capes, should be located as precisely as possible. Between these points, the chartmaker drew, as an artist might, the coastline.

The stylizing of a coastline can be an implicit visual design signature. We can simulate Chaves' method in ArcMap. Just as Alonso recommends that the chartmaker first locate two features, in ArcMap we georeferenced Cabo Branco and Cabo Verde on four charts and *La Carta del Cantino*. Georeferencing positions the two capes on each historical chart at the same two points on a modern digital map, and applies the same scale to all five charts. This makes it possible to compare the design used by each chartmaker to present the same piece of coast.

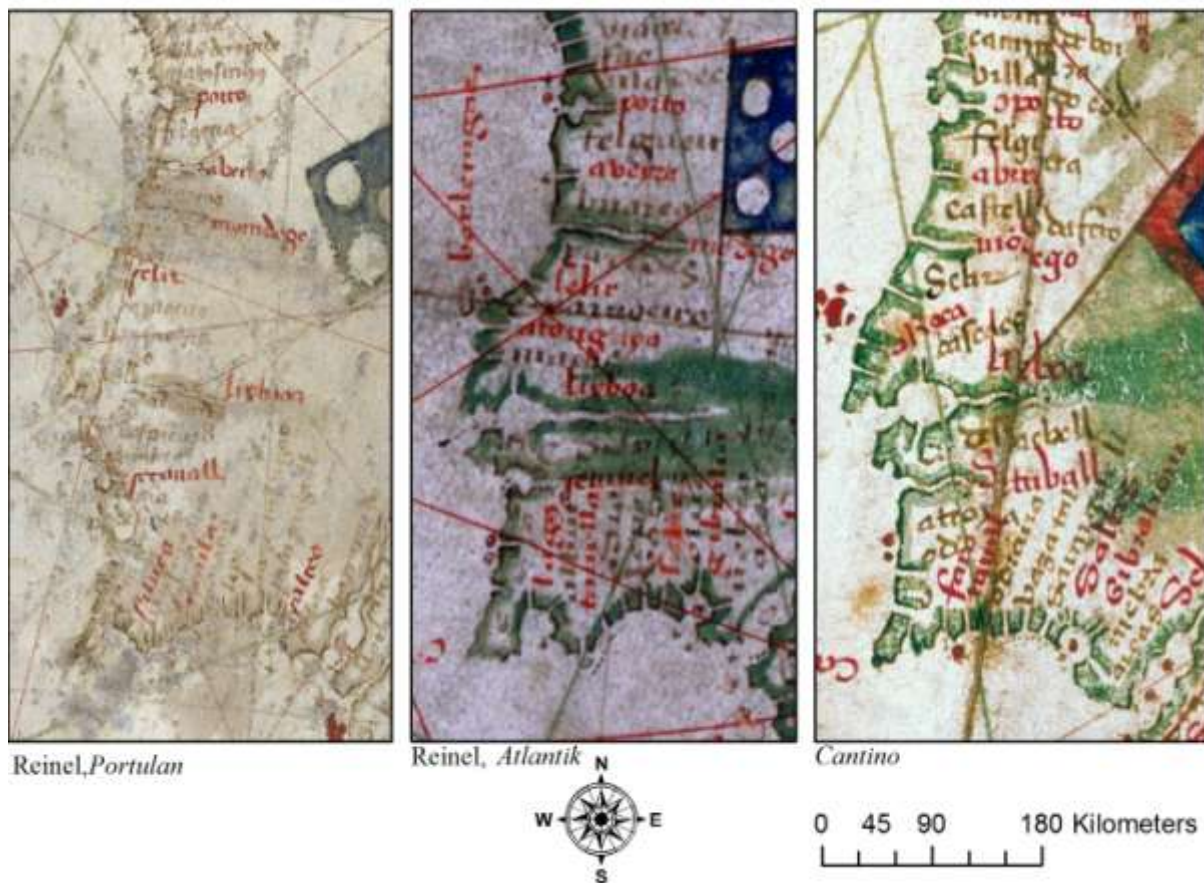
Map 2 shows how chartmakers drew the same stretch of coastline on five charts. Between Cabo Branco in the North and Cabo Verde in the South, each chartmaker makes slightly different artistic choices in depicting the coast. On the *Carta Nautica*, the oldest surviving Portuguese chart, the coastline appears as a thin line, with a light brown pigment added along the landside. Jorge de Aguiar used a fine line for the coastline on his 1492 *Portolan Chart of the Mediterranean*. He richly illustrated Cape Verde with green, and he selected a bright blue for the Senegal River. Pedro Reinel used brown on the landside and a thicker line to mark the coast on his West African *Portulan*. He also highlighted Cabo Verde with green. On his *Atlantik* chart, Reinel drew a bright green line on the landside, and this same green, with black mottling, enhances Cape Verde. On *La Carta del Cantino*, the chartmaker created a coastline with a green pigment brushed on the landside. Comparing the five charts, it is clear that the geographic information is highly similar. The discernible differences appear in the design, or artistry, or in the symbology used to represent the coastline. The coastlines of *La Carta del Cantino* and the *Portulan de Pedro Reinel* are distinctively similar.



Map 2: Five West African Coastlines from Cabo Branco to Cabo Verde.

A closer comparison of the Portuguese Atlantic coastline on *La Carta del Cantino* with the two charts signed by Pedro Reinel is also striking. The coast of Portugal appeared on chart after chart in Lisbon in the early sixteenth century. Surely, chartmakers created this familiar coastline so often that it required little reflection. Map 3 presents the Portuguese Atlantic coastline on the two charts signed by Pedro Reinel and on *La Carta del Cantino*. The *Portulan* signed by Pedro Reinel is quite faded as compared to the *Atlantik* and *Cantino* charts, nevertheless similarities are apparent. The stylized teeth-like segments appear on all three charts as does the highlighting of the land side of the coastline. On the *Atlantik* chart by Pedro Reinel the thick green coastline is highly similar to the coastal design on *La Carta del Cantino*. A coastline rendered with teeth-like segments, highlighted with green are, we believe, a design signature of Pedro Reinel.

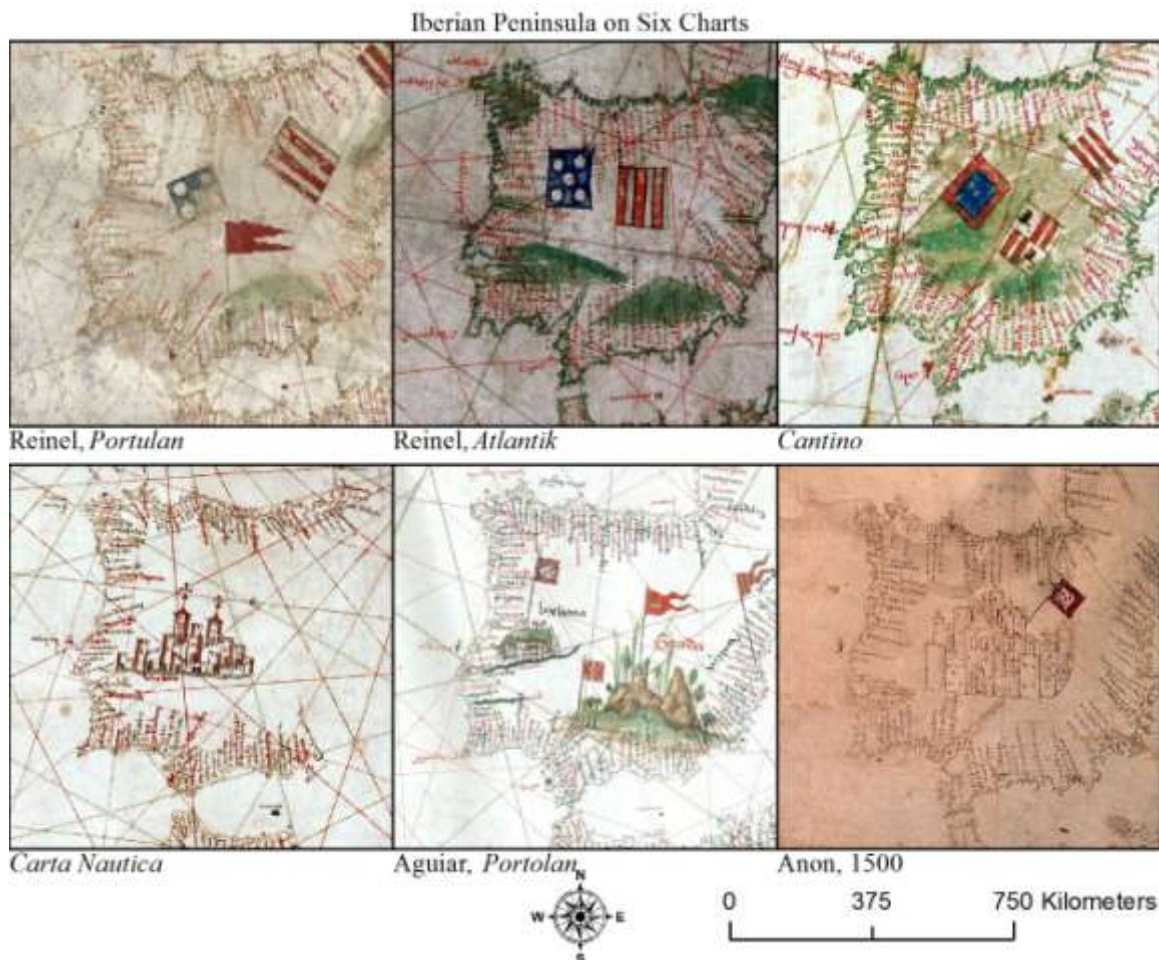
Portuguese Atlantic Coastline on Three Charts



Map 3: The Portuguese coastline on two charts signed by Pedro Reinol and *La Carta del Cantino*.

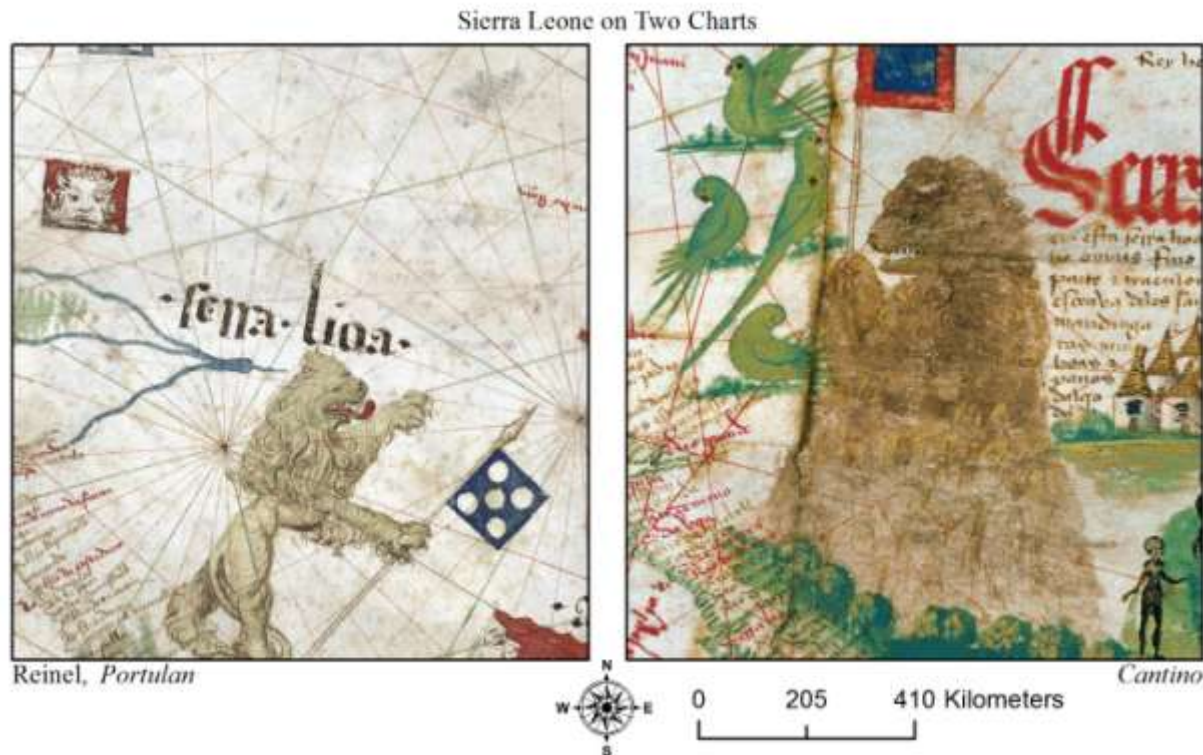
Now let us turn to more obvious visual elements. The surviving nautical charts made in Lisbon carry few illuminations, and the most common ones are simple symbols, such as flags. A step above flags are small cityscapes. A few charts carry stylized representations of landscapes—mountains, forests—and even fewer have animals or native peoples associated with specific locations. Because it is such a sumptuous world chart, *La Carta del Cantino* has many illuminations—from the trees in Brazil and Newfoundland, to the parrots in Brazil and West Africa, to multiple cityscapes and vignettes of villages in Africa. Let us first compare simple visual enhancements such as flags and cityscapes. Map 4 presents the Iberian Peninsula on six historical charts all georeferenced at the same three points in ArcMap. Flags—some with the Portuguese crest (blue with five white dots, sometimes bordered with red) and others with the Castilian crest (red and white, sometimes with a castle)—appear on five of the six charts. Cityscapes appear on three charts, and a landscape appears on one. The top row presents the two charts signed by Pedro Reinol and *La Carta del Cantino*, all of which use flags to designate the Iberian kingdoms. The bottom row shows the use of cityscapes to mark known places, such as Lisbon, and one landscape to represent Granada. All of the city and landscapes fly flags except for the oldest chart, the *Carta Nautica*, which does not show a crest, but its cityscape is clearly labeled Lixbonna (Lisbon). Although *La Carta del Cantino* has cityscapes for Jerusalem, Venice, and

São Jorge da Mina in West Africa, the Iberian Peninsula follows the styles used on the two charts signed by Pedro Reinel.



Map 4: Iberian Peninsula on Six Charts, showing flags, cityspaces, and flags and cityscapes.

Illuminations on *La Carta del Cantino* can be compared directly to other charts made in Lisbon at the same time. One illumination is a lion that signifies Sierra Leone. Map 5 shows Sierra Leone georeferenced against the modern African coastline on *La Carta del Cantino* and *Le Portulan de Pedro Reinel*. On each, lions appear above the toponyms in roughly the same area over the interior. On both *La Carta del Cantino* and *Le Portulan de Pedro Reinel*, the lions grip a pole that flies the Portuguese flag. The lions are not painted in the same way, nevertheless their use and position is a compelling similarity. It is tempting to see the lion holding a Portuguese flag as a clear, shared design signature. However, illuminations can be problematic because an illuminator might have been hired to paint the imagery. Alone, the lions cannot carry the case for Pedro Reinel.



Map 5: Lions Representing Sierra Leone on Reinel *Portulan*, left and *La Carta del Cantino*, right.

Other design features are evocative. The compass rose is a classic design trope on portolan charts. Not all charts have compass roses, and there is some disagreement among scholars about whether charts taken to sea ever had them (Astengo 2007, 192; Cortesão 1960, 159-160). Yet, Chaves (1535) notes the custom of decorating the central and sub-points with compass roses. More importantly, they appear on nearly all surviving Portuguese charts from the late fifteenth and early sixteenth centuries. Cartographic historian Heinrich Winter once suggested that the design of compass roses can be a signature of the chartmaker, but map historian Corradino Astengo critiqued this approach, arguing that Winter lacked sufficient roses to make a convincing case (Winter 1945; Winter 1950; Astengo 2007, 192). Although we cannot come close to the “exhaustive catalogue” recommended by Astengo, we can examine the patterns used in the design for compass roses on extant charts in the Portuguese tradition, and, we can compare the roses on the two charts signed by Pedro Reinel to those on *La Carta del Cantino*.

The roses on *La Carta del Cantino* are many and carefully crafted. There is a huge central rose, positioned over the center of Africa between the Tropic of Cancer and the Equator (fig. 1 center). Many smaller sub-roses appear on the chart, especially in the East (fig. 1 right). A careful examination of the world chart reveals two central points, one in India for the Eastern Hemisphere and one in Cabo Verde for the Western. Around these two points appear the compass sub-roses that punctuate the invisible circumferences. When viewed on the chart, the thirty-two point central rose (placed in the center of Africa) does not seem to match the eight-pointed sub-roses. Yet, when removed from the world chart and viewed together, the shared design elements become visible. The sub-roses (fig. 2, right) are nearly identical: each has eight points, each red or blue triangle has a distinctive “scoop” taken out of each side, two concentric circles frame the rose, a pawn-like piece

sits on top to mark North, and a cross outside points East.⁶ All of these elements can be seen on the elaborate thirty-two point main rose (fig. 2, left): triangles have the same distinctive “scoop” taken out of the sides, two concentric circles colored with gold frame the rose, and a cross outside the rose marks East.

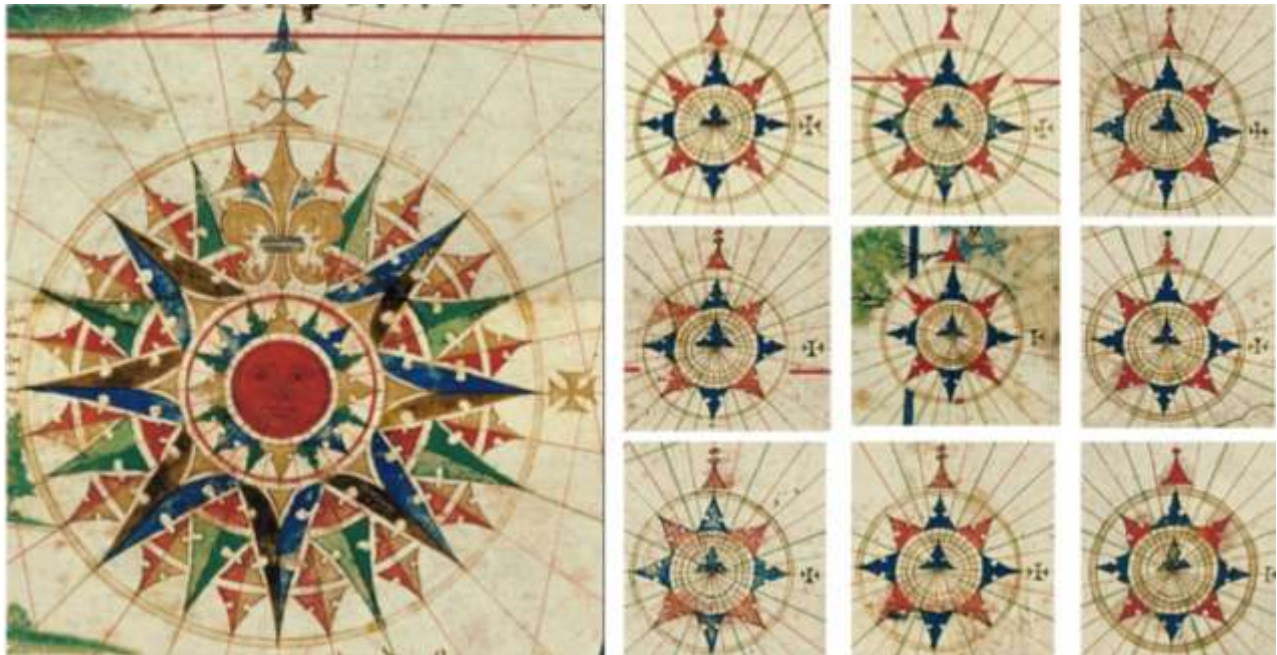


Figure 2: Compass Roses, *La Carta del Cantino*. Main Rose, left; selected sub-roses, right.

The sub-roses, and the distinctive central rose on *La Carta del Cantino*, are design signatures that lead to Pedro Reinel. On Reinel's *Atlantik* chart the central rose is very similar to the sub-roses on *La Carta del Cantino* (fig. 3 left). In addition, there is a half sub-rose that is an even closer match (fig. 3 bottom). In Photoshop the half sub-rose can be duplicated, rotated, and joined to itself (fig. 3 right). The result is a full compass rose that is a nearly perfect match to the sub-roses on *La Carta del Cantino*. This eight-point rose with red and blue scooped-sided triangles and an interior scooped triangular pointer is, we believe, a design signature of Pedro Reinel.

⁶ Winter noted these distinctive elements, see “A Late Portolan Chart,” 37-46 and “On the Real,” 25-27.

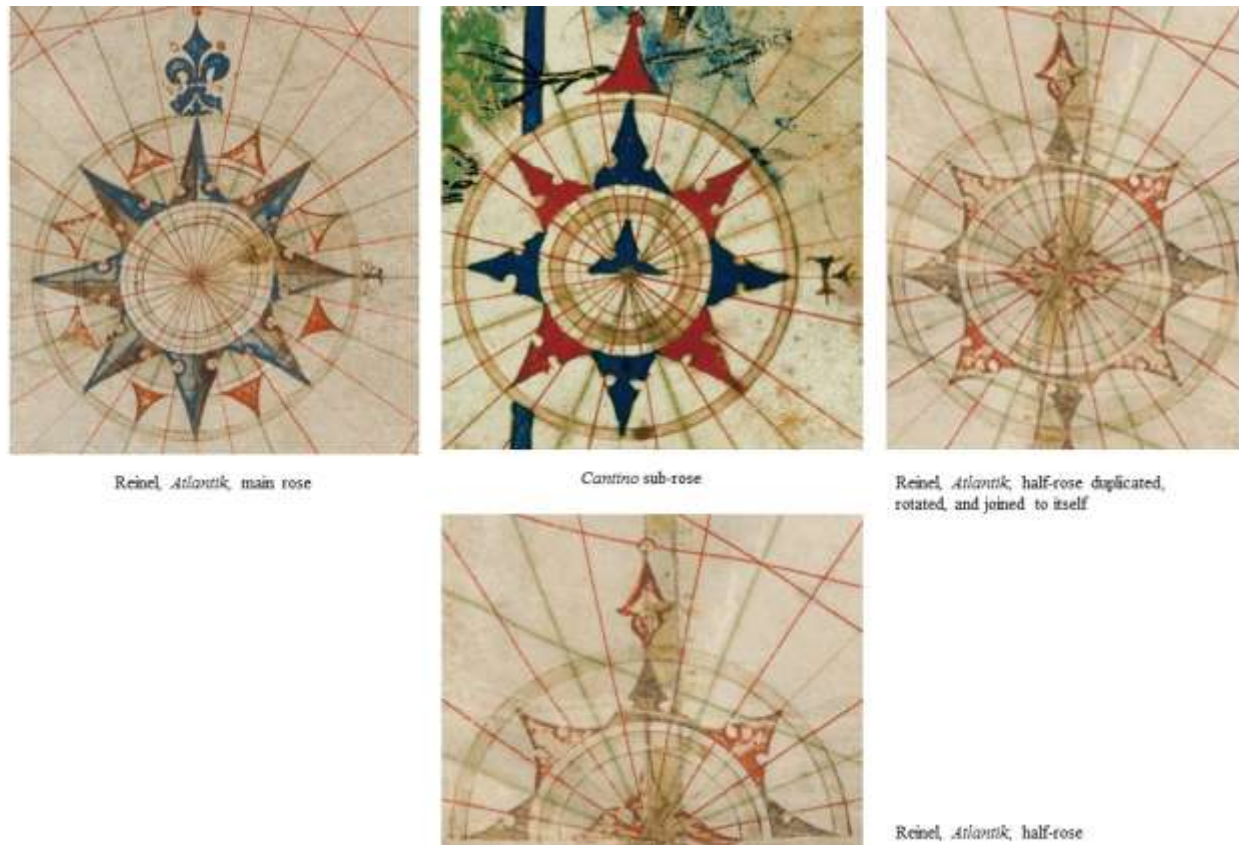


Figure 3: The Reinel Rose. Main Rose on Reinel, Atlantik, top left; Cantino sub-rose, top center; Reinel Atlantic half sub-rose, bottom center; Reinel Atlantic half sub-rose duplicated and joined to itself.

How common was this scoop-sided, eight-point rose? Because the vast majority of the Portuguese charts have not survived, it is impossible to know. The surviving Portuguese charts and planispheres reveal that it was not usual, and that it emerged in the first years of the sixteenth century, perhaps even with *La Carta del Cantino*. Figure 4 shows the evolution of the scoop-sided, eight-point rose from 1470-1520. The roses, presented in chronological order, imply that the appearance of this sub-rose on *La Carta del Cantino* was distinctive, making it a likely design signature. For our comparison, we use the eight-pointed roses on surviving charts in the Portuguese tradition.⁷ The scoop-sided, eight-point rose first appears in 1502 on *La Carta del Cantino*. The only antecedent to it appears on an anonymous chart of 1500.

In figure 4, the top row presents the first eight-point roses on surviving Portuguese charts. The earliest eight-point rose appears on the *Carta Nautica* (dated to the last three decades of the fifteenth century). It appears again in blue and red on Aguiar's *Portolan* (1492), as well as on Reinel's *Portulan* (1492; 1504). None of these roses have scoops taken out of the triangular pointers. The first time the triangles are enhanced is on the *Alte Welt* chart of 1500. On this chart, the enhancements to the

⁷ In addition to the charts cited above, n. 4, we use *Alte Welt*, 1500, Cod. icon 140, fol. 82, Bayerische Staatsbibliothek; *Carte marine portugaise*, 1510, Bibliothèque Nationale, France; Jorge Reinel, *Karte des Indischen Ozeans*, 1510, cod. Guelf. Aug. fol. 93, Herzog August Bibliothek, Wolfenbüttel; Rodrigues, *Livro*, 1513, La Bibliothèque de l'Assemblée nationale, <http://archives.assemblee-nationale.fr/bibliotheque/manuscripts/index.htm> and *Atlas Miller*, 1519 Registre C ; 28836, Bibliothèque Nationale, France. We deliberately exclude any compass roses on nineteenth-century copies.

triangles are two circles at the base of each of the eight pointers. On *La Carta del Cantino*, the scoops are placed midway up the triangular blue and red pointers. In the second row of figure 4, the scoop-sided, eight-point roses are more common. The half rose on the Reinel *Atlantik* reproduces this design element, as does the *Karte des Indischen Ozeans* attributed to Jorge Reinel (1510). The scooped rose reappears in the charts contained in the *Livro de Francisco Rodrigues* (1513), and on charts in the *Miller Atlas* of 1519, which are often attributed, at least in part, to the Reinel workshop.

The Evolution of the Eight-point Rose

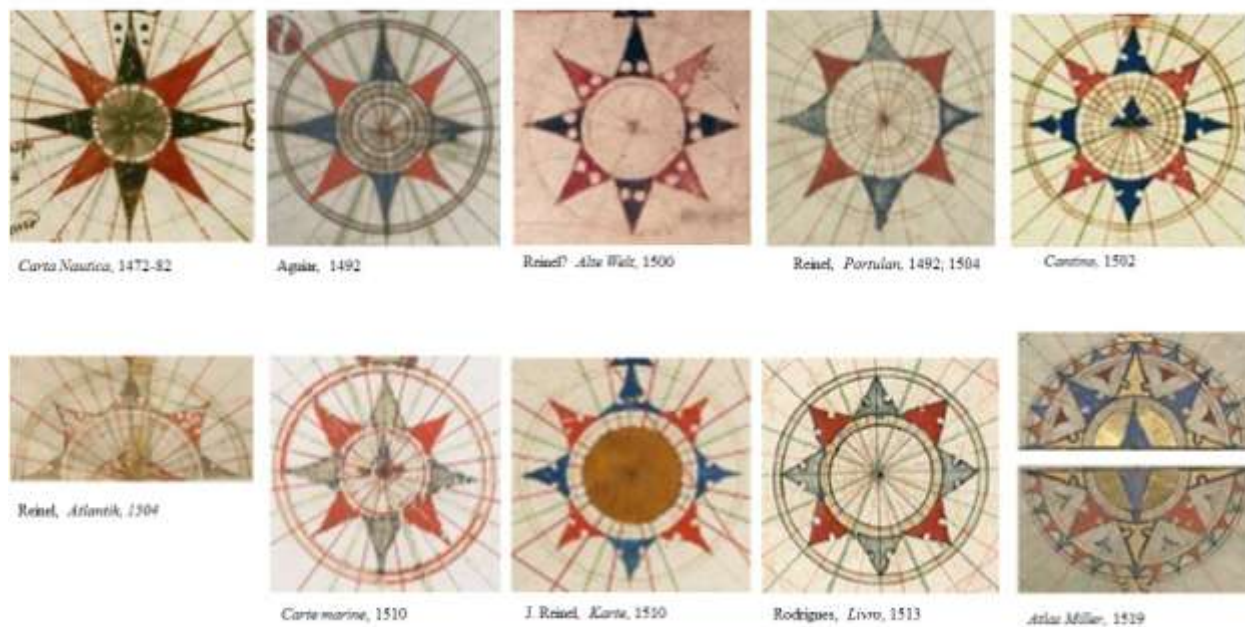


Figure 4: The Evolution of the Eight-point Rose.

A third design signature appears in the lettering on a chart. Here we must be cautious, for it is possible that a scribe could have been hired to letter a chart, especially one as large as *La Carta del Cantino*. There are three styles of lettering on *La Carta del Cantino*: one used for the toponyms and textual legends (such as the one opposite Brazil), a second for the most important labels, and a third is an irregular cursive most likely added after the map was finished (Fernandes 2003, 39-50). We shall focus on the first two, which were clearly planned and added to the world chart in the workshop. The first style is the *letra cortesã*, a blended gothic and humanistic script that emerged in the late fifteenth and early sixteenth centuries in royal and seigniorial courts in Portugal (Fernandes 2003, 39-50). The second is gothic. Most chartmakers surely could enter the toponyms, using the *letra cortesã*, but might not have the requisite skills needed to create the elegant gothic labels, some of which have elaborate capitals. The Reinel workshop, however, is known to have produced hand-lettered parchments. Two illuminated diplomas, or *Cartas de Armas*, one for Diogo Vasques, Knight of the Order of Santiago, made in 1514, the other made in the same year for Diogo Pimental, a *fidalgo* and *escudeiro*, were signed by Pedro Reinel.⁸ *Cartas de Armas* were painted on parchment, and included fine lettering as

⁸A record of the Pimentel carta appears in the Chancelaria de D. Manuel I, liv. 15, fl. 58v, Arquivo Nacional Torre do Tombo, Portugal, hereafter ANTT, and the Vasques carta appears in the Chancelaria de D. Manuel I, liv. 11, fl. 42, ANTT.

well as richly painted coats of arms. Clearly Pedro Reinél would have had the skill needed to create the labels using a gothic style.

There is a second problem with finding design signatures in letters, and that is that styles of writing make the formation of letters highly similar. If we examine the scripts used on the West African coasts (see map 2, above) all five chartmakers entered toponyms in a clear hand, in Portuguese, and in black and red inks. Four of the chartmakers all used a similar script, the *letra cortesã*. The outlier is the *Carta Nautica*; its script is likely an earlier style given that it is the oldest chart (dated c. 1472-1482). If we examine the lettering of the toponyms on the Portuguese Atlantic coastline (see map 3, above) we can compare the lettering on Reinél's *Portulan* (map 3, left), the *Atlantik* chart by Pedro Reinél (map 3, center), and *La Carta del Cantino* (map 3, right). The result is impressive. Although the *Cantino* has a seam in the vellum running at a diagonal, splitting some of the toponyms, and Reinél's *Portulan* (map 3, left) is quite faded, it can clearly be seen that the lettering of "Porto" and "Lisboa," as well as other toponyms is very similar on all three charts.

The second script is used on *La Carta del Cantino* is a gothic style, used for the oceans, the Equator, and the Tropics of Capricorn and Cancer, as well as several prominent places. Jorge de Aguiar uses some gothic lettering on his chart of 1492, as does Pedro Reinél on the *Portulan* and *Atlantik* charts. Gothic lettering is far more extensive on *La Carta del Cantino*, and this is most likely due to its size and its intended patron. Not only are the gothic labels large and carefully painted, but many are in Latin.

Using the few examples of gothic lettering on the two charts signed by Pedro Reinél and the many examples on *La Carta del Cantino*, we compare the formation of the lowercase letter "r." We select the "r" because it is formed in two distinctive ways on all three charts, suggesting an inadvertent design signature. One style of the letter "r" is rounded and can be seen on Reinél's *Portulan* in the label for the Atlas Mountains: "montes claros em africa" (fig. 5, top row). The rounded "r" is most clear in "claros;" it is less rounded in "africa." On *La Carta del Cantino* the label is nearly identical—"Os montes claros em affrica"—but all of the "r"s are angular (fig. 5, third row). If we examine Reinél's *Atlantik*, the label is different—"Partes de africa"—but we can see both "r"s. Reinél's "r" in "partes" is rounded, but Reinél uses an angular "r" in "africa" (fig. 5, second row)



Figure 5: Gothic Lettering on Three Charts.

It seems that Reinel used two styles—one angular, one rounded—for the lower case “r”s in his gothic script on his two signed charts. This pattern is also visible on the *Cantino* where angular and rounded “r”s both appear. The rounded “r” is less common, but it can be seen in the label “Prasso prosmōtorio” and “Terra del Rey de portuguall” (fig. 5, bottom row). Possibly the rounded “r” derives from the letra cortesã, and Reinel included it out of habit even though when using a gothic script he generally used the angular “r.”

Finally, let us examine Reinel’s signature on the two signed charts. On the *Atlantik*, he signs “Reinel” in black gothic letters. On the *Portulan*, he again uses black gothic, but the signature is more elaborate. He signs his full name and provides a decorated capital P. The “l” of Reinel is slightly enhanced with three whimsical sketches of facial profiles coming off the letter “l”. *La Carta del Cantino* carries no signature; however, we can easily reconstruct Reinel’s signature using letters from *La Carta del Cantino*. Figure 6 illustrates that Pedro Reinel could certainly have lettered the gothic script on *La Carta del Cantino*.



Figure 6: The Reinel Signature on Two Signed Reinel Charts and Pieced from letters on *La Carta del Cantino*.

The case for Pedro Reinel rests on multiple design similarities from the design of coastlines, the choice of illuminations, the distinctive compass roses, the script used to enter toponyms, and the gothic “r”s. Why would a chartmaker such as Pedro Reinel produce an elaborate illuminated world chart in 1501-1502 in Lisbon under the threat of death? One very obvious explanation might be that the chartmaker needed the income. Chartmakers possessed extremely valuable information drawn from the lived and eyewitness experience of mariners, but they were still craftsmen who struggled to make a living. The chartmakers of early sixteenth-century Lisbon were most likely similar to their forbears in the fifteenth century, who as map historian Tony Campbell notes, mostly were poor (apart from a few of noble birth) because making charts took time and skill and was not very lucrative (Campbell 1987 434). Even with the greater demand for maps during the age of exploration, chartmakers most likely saw themselves as artisans or struggling members of the lower nobility. They took the commissions that came their way and sold their work to those who were willing to pay for it. Pedro Reinel created the *Atlantik* chart two years later, but no more signed charts by his hand survive. Nearly two decades later, however, Pedro Reinel’s abilities as a chartmaker appear in a variety of documents related to Magellan’s circumnavigation, 1519-1521. According to an historian living in the early seventeenth century, when a disillusioned Fernão de Magalhães (known in English as Magellan) left Portugal, he brought with him to Spain “a planisphere drawn by Pedro Reynel [Reinel],” which he used to persuade the young Spanish king that the Moluccas lay in the Spanish sphere (Argensola 1609, 16).⁹ Subsequently, Pedro’s son, Jorge Reinel, left Portugal for Seville where he made maps for Magalhães, who commissioned charts, including a world planisphere for the

⁹ “Buelto [Magallanes] a Portugal, no le hizieron merced, antes se juzgo por agraviado, y sintiendo el disfavor, passó a Castilla, trayendo vn Planisferio dibuxado por Pedro Reynel. Por el qual, y por cõferencias, que por cartas avia tenido con [Francisco] Serrano, persuadio al Emperador Carlos V. que las Malucas eran de su derecho” (Leonardo de Argensola 1609: 16).

Spanish king, from multiple chartmakers (Navarrete 1825-1837; 1946, IV: 143).¹⁰ Moreover, Sebastião Álvares, the Portuguese king's factor in Seville, wrote to the Portuguese king that he saw a globe and a map made by Jorge Reinel in Seville. "I saw placed on the globe and map that was made here by the son of Reynell [Reinel]," Álvares states in his letter, "who was not yet finished when his father arrived for him, and the father finished everything for him, and he placed [on the map] the Moluccas."¹¹ Not only did Pedro Reinel finish the planisphere, and locate the Moluccas, but his world chart served, Alvares claimed, as the template for all of the charts made by Diogo Ribeiro. Ribeiro, also originally Portuguese, became one of the most important cartographers for Spain, and his world map of 1529, known as the *Carta Universal*, is considered to be one of the most important cartographic productions of the sixteenth century, in part because of its illustrations of navigational instruments (Davies 2003). Reinel, Alvares writes in his letter, also made the compasses, quadrants, and spheres for Magalhães' armada.¹²

The sixteenth-century Portuguese historian, Fernão Lopez de Castanheda, confirms Alvares' observations. Castanheda wrote that two Reinel planispheres were recovered from one of Magalhães' ships in Maluco (Maluku) after the Portuguese took in the sick men and retrieved the maps, instruments, and pilot books. Castanheda recounts that the two Reinel planispheres, as well as other large charts showing the Portuguese route to India and from India to the Moluccas, were "all wrong" (Castanheda 1551-1561 6: XLI, lviii-lix).¹³ Their errors lay in the placement of the Moluccas; Reinel depicted them as lying within the sphere of Spain.¹⁴

The draw of Spain, where Magalhães, Ribeiro and others had already found a way to further their interests did not, in the end prove to be the choice made by Pedro and Jorge Reinel. Although Pedro Reinel finished the charts for Magalhães and made the navigational instruments for the armada, because, as Sebastião Álvares conveyed to the Portuguese king, he needed to earn his living, there were other factors at play.¹⁵ Immediately after the return of the *Victoria*, the lone ship of Magalhães's fleet to complete the circumnavigation, Pedro and Jorge Reinel were feted in Spain. Described as "famous Portuguese pilots," father and son were received at the Spanish court in 1522, according to a Spanish historian of the late sixteenth century (Herrera 1601 IV: xiii, 168). Two years later when Spain and Portugal sent representatives to meet at the Junta de Badajoz-Elvas (11 April to 31 May 1524) to determine the exact location of the Moluccas, Pedro and Jorge Reinel were present. As Alison Sandman has shown, Spanish and Portuguese cartographers were extremely important at the

¹⁰ Magalhães paid Nuño García 11,250 *maravedís* (30 ducats) for 11 charts; Rui Faleiro, Magalhães' initial partner, ordered six charts at 5 ducats each, and Magalhães paid 4,500 *maravedís* (12 ducats) for a world chart for the king, Navarrete (1825-1837; 1946 IV: 143).

¹¹ "eu vy asentada na poma e carta, que ca fez o filho de Reynell, a qual nom era acabada quando caa seu pay veio por ele; e seu pay acabou tudo; e pos estas terras de Maluco," Álvares to King Manuel of Portugal, Seville, 18 July 1519 in Arquivo Nacional Portugal (1892: 434).

¹² "e por este padram se fazem todallas cartas; as quaees faz Diogo Ribeiro; e faz as agulhas, quadrantes e esperas," Álvares to King Manuel of Portugal, Seville, 18 July 1519 in Arquivo Nacional Portugal (1892: 434).

¹³ "& assi [foram achados] dous planispherios de Fernão de Magalhães feytos por Pero Reynel, & outras cartas grandes do caminho dos Portugueses ate a India, & quarteroens dela ate Maluco, & todos errados" Castanheda (1551-1561 6: XLI, lviii-lix).

¹⁴ These planispheres and charts no longer exist, but a nineteenth-century copy of a planisphere (the original of which was lost during WW2) is attributed to Jorge Reinel and is titled *Welt (Planisphäre) c. 1519*. This world chart is believed to be a planisphere made for Magellan in Seville, see Kupčik (2000: 41-47).

¹⁵ "nem quer mais que ganhar de comer por seu engenho." Álvares to King Manuel of Portugal, Arquivo Nacional Portugal (1892: 434).

Junta, for only they could argue persuasively about where the Moluccas lay (Sandman 2001, 26-27; 78-87). It was also a time of intrigue, as the Portuguese delegation included agents later known to be secretly working for Spain (Marques 2006, 88-92; Cortesão and Mota 1960, I: 50-51). Portuguese diplomats at the Junta, Diogo Lopes de Sequeira and Antonio de Azevedo Coutinho, wrote to the King of Portugal that agents of King Charles V were courting the Reinels. In the letter written to king Dom João III, Sequeira and Coutinho report seeing the very documents.¹⁶ Spain offered Pedro Reinel the position of “master of making charts, astrolabes and other instruments needed for navigation” at an annual salary of 35,000 *maravedis* (93 1/3 ducats); Jorge was offered 30,000 *maravedis* (80 ducats) (Amaral 1995, 46-48; Sandman 2001, 82 n. 131; Cortesão and Mota 1960, V: 144). Yet, the Reinels did not take these Spanish offers, and returned instead to Portugal, where they received far smaller annuities from the Portuguese crown.

In the short run, Pedro Reinel seems to have been willing to sell his knowledge to those willing to pay for it. In the end, however, he and his son did not decamp for Spain. They chose to remain far more poorly paid in Lisbon. Why? Some clues come from the Reinel name, which is not particularly common (Viterbo 1898 I: 256; Amaral 1995: 39-40), but does appear in a variety of documents from the late fifteenth and early sixteenth century associated with Africa and India. If those named Reinel were loosely related, this was a family that sought opportunities that came with the opening of the Portuguese maritime empire. Some members achieved status and recognition for their services to the King abroad and became part of the lower nobility.

In the late fifteenth century, Martim Reinel, *escudeiro* to King João II and later *cavaleiro* to King Manuel, served as one of two *feitores* (administrators) at Azamor (today Azzemmor, Morocco) for fifteen years, until his death in 1501 (Marques 1988, III: 1461-1500; Pessanha and Freire 1906, 446-447). Another Reinel who served as a *feitor* in Africa was Rodrigo Reinel. King João II charged Rodrigo Reinel to open a short-lived trading post east of Arguim, along the trans-Saharan trading route at Audém, today Ouadane, Mauritania (Barros 1628 III: 59).

It has long been argued that as a young man Pedro Reinel had traveled in Africa as part of a diplomatic mission sent by king João II to Guinea (Harrisse 1882, 162; Cortesão and Mota 1960 I: 19; Amaral 1995, 41-42; Marques, A. P. 2006, 65-80). The evidence comes from the royal chronicler, João de Barros, who described a deputation of eight men sent with gifts to the king of the Mandingos; Barros identifies the only man to survive (the others having succumbed to disease) was a *moço despóras* (stirrup boy) named Pero [Pedro] Reinel (Barros 1628 III: 58v). Reinel lived, Barros suggests, because “he was a man accustomed to traveling in those regions.”¹⁷ Some scholars have suggested that this Pedro Reinel was the son of Rodrigo Reinel, and may have even been the son of an African woman and therefore of mixed race. There are two references in extant documents that seem to confirm this. Two documents refer to “negros” in ways that seem to describe Pedro and

¹⁶ “me descobrio Pero Reynel como era requirido por parte do Emperador, que se fosse pera elle, e assi seu filho, e que lhes escrevia cartas assinadas por sua mão . . . e oje quinta feira nove deste mes, o dito Pero Reynel foi a Badajos . . . e trouxe comsigo huma carta do Emperador para seu filho Jorge Reynel, em que lhe da trinta mil raias . . . e o Pero Reynel amostrou a carta a Diogo Lopes de Sequeira y a mi, y a vimos y he do Emperador” (Viterbo 1898 I: 264; original in Gaveta 18, maço 8, doc. 13, ANTT).

¹⁷ “escapou Pero Reinel por ser homem costumado andar naquellas partes: e os mais faleceram de doença” (Barros 1628 III: 58v).

Jorge.¹⁸ No further evidence has been found and no conclusive genealogical work has been done (Marques 2006, 78-79).

Several Reinels served in India, showing again the pattern of men in the family seeking opportunities in the Portuguese maritime world. A Rodrigo Reinel, whether or not he was the same Rodrigo Reinel who had opened the trading post in Audém is uncertain, held the post of factor (*feitor*) on the *Esmeralda*, a ship in the ill-fated fleet of five captained by Vicente Sodré, a nobleman and maternal uncle of Vasco da Gama. Sodré's fleet, with Rodrigo Reinel aboard the *Esmeralda*, headed to India with Da Gama's large armada in 1502.¹⁹ Other Reinels engaged in trade with North Africa. Braz Reinel received a license in 1501 for trade in the kingdom of Fez; he received a second license ten years later that permitted him to take with him a young boy, perhaps his son. Vicente Reinel's 1504 license also allowed him to trade by land or by sea, but clearly stated that he was not to take with him his wife or children. Both Vicente and Braz Reinel are identified in the documents as New Christians.²⁰ In 1497, Jews in Portugal were forcibly converted to Christianity, becoming known, as were their descendants, as New Christians (Saraiva 2001, xv; 11-15; Marcocci 2010, 360). The identification of Braz and Vicente Reinel as New Christians opens up the possibility that others surnamed Reinel (with various variant spellings—Reinell, Reynel, Reynell, Rreinel) were originally Jews.

If Pedro Reinel was from a family of New Christians, this fact offers a possible explanation for why the Reinels returned to Portugal. Huge dislocations took place in Portugal following the proclamations by King Manuel in December 1496 that expelled Castilian *conversos* (converted Jews) and ordered Portuguese Jews and Muslims to leave the kingdom within ten months. Subsequent decrees forced the overwhelming majority of Portuguese Jews to convert to Christianity. In 1497, many Jews hoped to leave Lisbon, but most were prevented from doing so. Children were taken from their parents, communal property—such as synagogues and schools were seized—and forced baptisms took place (Soyer, 2007a, 182-240). In the following years, suspicion of New Christians intensified, the Lisbon massacre of 1506 being a shocking example (Yerushalmi 1976; Soyer, F 2007b). Living on the Travessa da Misericórdia, near the synagogue that would become the Nossa Senhora da Conceição church, Pedro Reinel was surrounded by these events. In considering why, in 1524, Pedro and Jorge turned down more lucrative offers from Spain and instead return to Portugal one reason might have been that New Christians had had to think strategically about the advantages of living in Portugal vs. in Spain. In Spain, *conversos* were highly persecuted by the Spanish Inquisition, whereas in Portugal King Manuel had granted New Christians two decades of immunity (later extended by 16 years) from investigation by church authorities (Saraiva 2001, xv; 11-15; Marcocci 2010, 360). There was not, as of yet, an Inquisition established in Portugal when the

¹⁸ In the letter of Sequeira and Azevedo Coutinho there is a reference to “negros,” which appears to refer to the Reinels: “Ihe mandara estes negros, e outros muito melhores mestres que estes” (Viterbo 1898 I: 264; original in Gaveta 18, maço 8, doc. 13, ANTT). In addition to his text a second use of the term “negro” was found by Marques. These documents are used as evidence that Pedro Reinel was African or of mixed race (Marques 2006, 68; Moreira 2015).

¹⁹ On Rodrigo Reinel, see “Mandado do almirante D. Vasco da Gama,” TT Online, PT-TT-CC/2/7/21; “Ordem de Francisco de Albuquerque,” TT Online, PT-TT-CC/2/7/163, and “Provisão de D. Manuel,” TT Online, PT-TT-CC/2/49/49.

²⁰ “A Bras Reinel, cristão novo, morador na cidade de Lisboa, licença” [1501] Chanc. D. Manuel I, bk. 17, p. 88v MF:2498, ANTT; “A Bras Reinel, cristão novo, licença,” [1511] Chanc. D. Manuel I, bk. 8, p. 77 MF: 3870, ANTT; “A Vicente Reinel, cristão novo, licença,” Chanc. D. Manuel I, bk. 22, p. 81v MF 6703, ANTT.

Reinels decided to return. In 1536, the Holy Office of the Inquisition was established in Portugal, and several Reinels were accused of being secret Jews.²¹ Pedro Reinel's wife, Isabel, made a denunciation against New Christians in 1547, one of whom had her very same name, Isabel Fernandes.²²

If, on the other hand, Pedro Reinel was Luso-African, as Marques (2006: 68, 78-79) and Moreira (2015) argues, the desire to return to Lisbon would have had little to do with the plight of New Christians. It would, however, reflect a similar calculation: that a Luso-African would fare better in Lisbon than in Seville. Moreira (2015) argues that a community of African artists from Senegambia, Guinea, and Sierra Leone worked in Lisbon, forming an elite among artisans specializing in marble and creating a hybrid Afro-Portuguese art.

La Carta del Cantino or *La Carta del Reinel*? The difference is obvious. The world chart is the same, but our understanding of it changes. A Cantino world chart presents the crown's secret knowledge of maritime exploration; a Reinel world chart reveals how a skilled artisan, enmeshed in the maritime community, chose to represent the world. In both cases, the world chart clearly displays the geographic knowledge known to many in the maritime community—that of sailors, gunners, pilots, navigators, and artisans who worked for their livings on ships and accumulated huge reservoirs knowledge, most of it transferred orally. However, a Cantino World Chart lends credence to the desire of the Portuguese crown to keep much of this information secret, whereas a Reinel World Chart illustrates that it is impossible to do so. Not only were mariners highly mobile, but merchants relied on charts, too. The crown could put a death threat on chartmakers who gave out valuable information, but that in and of itself spoke to the power of the chartmaker, who was not a puppet of the state but rather a creative synthesizer of new knowledge. With each new chart, chartmakers made sense of the oral knowledge in the maritime community, and with each they developed shared and accepted ways of conveying that knowledge. If Pedro Reinel indeed made *La Carta del Cantino*, not only does the agency of the chartmaker become visible, but so too does the skill and the imagination of an early modern artisan chartmaker. More than a maker of maps, that chartmaker was an artist.

²¹ Braz Reinel: Inquisição de Lisboa, Livro das Denúncias 56, ff. 94v, MF 5125, ANTT; Pedro Vaz: Inquisição de Lisboa, Processo 03346, ANTT; Alexandre Reinel: Inquisição de Lisboa, Processo 6238, ANTT; Grácia Fernandes: Inquisição de Lisboa, Processo 11121, ANTT.

²² Livro das denúncias, Inquisição de Lisboa, 52, ff. 165, microfilm 5102, ANTT, also transcribed in Viterbo (1898 I: 340-341).

References

- Albuquerque, L. de and J. L. Tavares (1967). Algumas observações sobre o Planisfério “Cantino” (1502). Coimbra: Junta de Investigações do Ultramar.
- Alegria M., S. Daveau, J. C. Garcia, F. Relaño (1998). Cartografia e viagens. In F. Bethencourt and K. Chaudhuri (eds.), *História da Expansão Portuguesa. I: A Formação do Império 1415-1570*. Lisbon: Círculo de Leitores.
- Alegria M., S. Daveau, J. C. Garcia, F. Relaño (2007). Portuguese cartography in the Renaissance. In D. Woodward (ed.), *The History of Cartography. III: Cartography in the European Renaissance*. Chicago & London: The University of Chicago Press, 975-1068.
- Amaral, J. F. do (1995). *Pedro Reinel me fez: A volta de um mapa dos descobrimentos*. Lisbon: Quetzal.
- Argensola, Bartolomé Leonardo de (1609). *Conquista de las islas Molucas*. Madrid: Alonso Martin. Biblioteca Digital Mundial, <http://www.wdl.org/es/item/395/>.
- Arquivo Nacional Portugal (1892). *Alguns documentos do Archivo Nacional da Torre acerca das navegações e conquistas portuguesas*. Lisboa: Imprensa Nacional. Biblioteca Nacional de Portugal, <http://purl.pt/26221>.
- Astengo, C. (2007). Renaissance Chart Tradition in the Mediterranean. In D. Woodward (ed.), *The History of Cartography. III: Cartography in the European Renaissance*. Chicago & London: The University of Chicago Press, 174-237.
- Barros, J. (1628). *Decada Primeira da Asia de João de Barros: Dos feitos que os Portugueses fizeram no descobrimento & conquista dos mares & terras do Oriente*. Lisbon: Jorge Rodriguez.
- Buisseret, D. (2003). *Mapmakers' Quest: Depicting New Worlds in Renaissance Europe*. Oxford: Oxford University Press.
- Castanheda, F. L. de (1551-1561). *Historia do descobrimento e conquista da India*. 9 vols. Coimbra: João da Barreyra.
- Chaves, A. de (ca. 1535). Quatri partitu en cosmographia pratica i por otro no[m]bre llamado Espeio de Navegantes. Biblioteca Digital, Real Academic de la Historia. <http://bibliotecadigital.rah.es/dgbrah/es/consulta/registro.cmd?id=2914>.
- Cortés, M. (1551). *Breve compendio de la esfera y del arte de navegar*. Seville: Anton Alvarez.
- Cortesão, A. (1960). *Cartografia Portuguesa Antiga*. Lisboa: Comissão Executiva das Comemorações do Quinto Centenário da Morte do Infante D. Henrique.
- Cortesão, A. (1969). *História da cartografia portuguesa*. 2 vols. Lisbon: Junta de Investigações de Ultramar.
- Cortesão, A. and A. T. da Mota (1960). *Portugaliae Monumenta Cartographica*. 6 vols. Lisbon: Imprensa Nacional Casa da Moeda.
- Cortesão, J. (1960). *A política de sigilo nos descobrimentos nos tempos do Infante D. Henrique e de D. João II*. Lisbon: Comissão Executiva das Comemorações do Quinto Centenário da Morte do Infante D. Henrique.

- Couto, J. (1997). *A Construção do Brasil: Ameríndios, Portugueses e Africanos, do início do povoamento a finais de Quinhentos.*, 2nd. ed. Lisbon: Edições Cosmos.
- Davies, Surekha. 2003. The Navigational Iconography of Diogo Ribeiro's 1529 Vatican Planisphere. *Imago Mundi* 55: 103–13.
- Domingues, F. C. (1990). Colombo e a política de siglio na historiografia portuguesa. *Revista Mare Liberum* 1: 104-116.
- Fernandes, F. L. (2003). *O planisfério de Cantino e o Brasil: Uma introdução à cartologia política dos descobrimentos e o Atlântico Sul*. Lisbon: Academia de Marinha.
- Gaspar, J. A. (2010). From the Portolan Chart of the Mediterranean to the Latitude Chart of the Atlantic: Cartometric Analysis and Modeling. Ph.D. Diss: Universidade Nova de Lisboa.
- Gaspar, J. A. (2012). Blunders, Errors and Entanglements: Scrutinizing the Cantino Planisphere with a Cartometric Eye. *Imago Mundi* 64: 181–200.
- Gaspar, J. A. and H. Leitão (2014). “Squaring the Circle: How Mercator Constructed His Projection in 1569.” *Imago Mundi* 66: 1–24.
- Guerreiro, I. (1992). *A Carta náutica de Jorge de Aguiar de 1492*. Lisbon: Academia de Marinha.
- Harley, J. B. (1988). Silences and Secrecy: The Hidden Agenda of Cartography in Early Modern Europe. *Imago Mundi* 40:57-76.
- Harley, J. B. (1990) “Introduction: Text and Contexts in the Interpretation of Early Maps.” In D. Buisseret (ed), *From Sea Charts to Satellite Images: Interpreting North American History through Maps*. Chicago: University of Chicago Press.
- Harley, J. B. (2001). Maps, Knowledge, and Power.” In J. B. Harley and P. Laxton (ed.), *The New Nature of Maps: Essays in the History of Cartography*. Baltimore: The Johns Hopkins University Press.
- Harrisse, H. (1882). *Jean et Sébastien Cabot Leur Origine et Leurs Voyages*. Paris: E. Leroux.
- Harrisse, H. (1892; 1969). *The Discovery of North America: A Critical, Documentary, and Historic Investigation*. London-Paris; rpt. Amsterdam: N. Israel.
- Herrera, A. (1601). *Historia general de los hechos de los Castellanos en Las Islas i Tierra Firme del Mar Oceano. Decada terzera*. Madrid: En la emplantá Real.
- Kupčák, I. (2000). *Munich Portolan Charts “Kunstmann I-XIII” and Ten Further Portolan Charts* Munich and Berlin: Deutscher Kunstverlag.
- Leite, D. (1923). O mais antigo mapa do Brasil. In C. M. Dias, R. Gameiro, and E. de Vasconcellos (eds.), *História da colonização portuguesa do Brasil*. Porto: Litografia Nacional, II: 223-281.
- Lamb, U. (1969). *The Quarti Partitu En Cosmographia by Alonso de Chaves: An Interpretation*. Coimbra: Junta de Investigações do Ultramar.
- Marcocci, G. (2010). Toward a History of the Portuguese Inquisition. Trends in Modern Historiography (1974-2009). *Revue de l'histoire des religions* 227: 355-93.
- Marques, A. P. (2006). “Nautical Cartography on Portolan-Charts in the Late Middle Ages, and the Contributions Made by Portuguese Cartography (15th – 16th Centuries).” In L. Homem, J. Reinel, P.

Reinel, A. de Holanda, and M. Moleiro (ed.), *Atlas Miller*. Facsim. edition. Barcelona: M. Moleiro, 57-102.

Marques, J. M. da S. A. Iria (ed). (1988.) *Descobrimentos Portugueses*. Ed. comemorativa dos descobrimentos portugueses. Lisboa: Instituto Nacional de Investigação Científica.

Milano, E. (1991). *La Carta del Cantino*. Modena: Il Bulino.

Monmonier, M. S. (2008). *Coast Lines: How Mapmakers Frame the World and Chart Environmental Change*. Chicago: University of Chicago Press.

Moreira, R. (2015). “Pedro e Jorge Reinel (at.1504-60) Dois cartógrafos negros na cõrte de d. Manuel de Portugal (1495-1521).” *Terra Brasilis* 4. <https://terrabilis.revues.org/1209>.

Navarrete, Martín Fernández de (1825-1837; 1946). *Coleccion de los viages que hicieron por mar los espanoles . . .* 5 vols. Buenos Aires: Editorial Guaranía.

Pereira, Moacyr Soares (1989). O Novo Mundo no Planisfério da Casa de Este, o ‘Cantino.’ *Revista da Universidade de Coimbra* 35: 271–308.

Pessanha, J. M da S. and A. B. Freire, A. (1906). *Archivo historico portuguez*. Lisboa: [s.n.].

Quinn, D. B. (1986). Artists and Illustrators in the Early Mapping of America. *Mariner’s Mirror* 72: 244-273.

Roukema, E. (1963). Brazil in the Cantino Map. *Imago Mundi* 17: 7-26.

Sandman, A. D. (2001). “Cosmographers vs. Pilots” Navigation, Cosmography, and the State in Early Modern Spain.” Ph.D. Dissertation. University of Wisconsin, Madison.

Saraiva, A. (2001) *The Marrano Factory: The Portuguese Inquisition and Its New Christians 1536-1765*. English edition. Leiden; Boston: Brill.

Soyer, F. (2007a). *The Persecution of the Jews and Muslims of Portugal: King Manuel I and the End of Religious Tolerance (1496-7)*. Leiden; Boston: Brill.

Soyer, François. (2007b). “The Massacre of the New Christians of Lisbon in 1506: A New Eyewitness Account.” *Cadernos de Estudos Sefarditas* 7: 221–44.

Trevisan, A. (1993). *Lettere Sul Nuovo Mondo: Granada 1501*. A. C. Aricò (ed). Venice: Albrizzi Editore.

Viterbo, S. (1898). *Trabalhos nauticos dos Portuguezes nos seculos XVI e XVII*. Lisbon: Academia Real das Sciencias.

Winter, H. (1947). On the Real and the Pseudo-Pilestrina Maps and Other Early Portuguese Maps in Munich. *Imago Mundi* 4: 25-27.

Winter, H. (1950). A Late Portolan Chart at Madrid and Late Portolan Charts in General. *Imago Mundi* 7: 37-46.

Wood, D. with J. Fels (1992). *The Power of Maps*. New York: Guilford Press.

Yerushalmi, Y. H. (1976). *The Lisbon Massacre of 1506 and the Royal Image in the Shebet Yehudah*. Cincinnati: Hebrew Union College-Jewish Institute of Religion.